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FINAL REPORT  
TECHNICAL ASSISTANCE CONTRACT  
PULP AND PAPER

ICAc 1802  
FOR  
FPR YUGOSLAVIA

SEPT. 14, 1962

HENRY J. PERRY  
PROFESSIONAL ENGINEER  
CONTRACTOR



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Final Report  
of  
Henry J. Perry  
Contract ICAC 1802

PAO/E 158-23-110-3-90046  
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Scope of Duties

Provide Technical and Economic Advice to the TAA in Pulp  
Paper and Converted Products over an 18 Months Period in  
Yugoslavia

March 14, 1961 - September 14, 1962

September 14, 1962

Respectfully Submitted

*Henry J. Perry*

Henry J. Perry  
Professional Engineer  
Advisor



### Acknowledgment

The contractor wishes to express his thanks and sincere appreciation to the members of the Industrijski biro for their valuable assistance and cooperation. Without it the project could not have been carried out.

Director Koselj of Radeče Paper Mill, President of the Paper Association was especially helpful as was Mr. Furlan of the TAA-Slovenia.



















#### A CONCLUSION:

1. The Yugoslavian forest consist of at least 52 % Beech, probably 30 % coniferous species and the balance Oak, Chestnut, Maple, Poplar and other species.
  2. Yugoslavia is therefore faced with a Beech utilization problem which the Pulp and Paper Industry must serve as best it can.
  3. The processing of Beech by the standard sulphate, sulphite and neutral sulphite pulping processes poses no unusual technical problem for the production of unbleached or bleached pulps.
  4. The use of these pulps is limited by amounts that can be used on a quality basis as well as by the limited paper tonnages which are produced now.
- There is evidence that Beech cold soda pulp can be used as a groundwood substitute partially replacing Spruce and Fir. As this groundwood is made by a different process than the other groundwoods, it is not possible to make a direct comparison of its properties with those of the other groundwoods.
5. The use of Poplar also poses no unusual technical problems. However, it is a plantation tree requiring, like Beech, special cultivation. It is available in limited amounts compared to Beech and its availability depends upon amounts planted, growth rates and cultivation.
  6. Poplar will also have approximately the same limited use as Beech in many grades even tho the Poplar pulp is usually stronger.



























6. A basic "Market Research" program should be started at once to form the foundation for any grade changes in existing mill and for expanded production for the future.
7. A detailed study of each individual mill and each paper machine with supporting equipment should be made. The objectives would be long-range continuous modernization, cost reduction, higher productivity. Changes in raw material and market demand based on forest situation and market research will have important effects on the end results.
8. The Institute role and a sound financial basis which can be supported by the mills must be established. The finest equipment deserves the finest staff procurable. Such a staff must be composed of highly experienced professionals, well motivated and aggressive.
9. The better participation and mandatory attendance at Institute training sessions.
10. The closer liaison and cooperation between the various mill operating staff, various engineers and their groups and research institutions.
11. The wide distribution of translations of foreign literature.
12. The intensive in-plant training to increase the skills of the workers, special symposiums or short courses on specialized subjects are warranted for supervisory personnel.
13. A modification of the bidding and specification techniques to obtain the advantages of advanced technology.















c) The third six months period

1. Advise regarding long term plans for developing production of paper and cardboard into packaging materials.
2. Offer assistance in organizing facilities and training activities for support of this development plan.
3. Be called upon to advise existing paper mills in their reconstruction activities; future production processes; and in their use of domestic available raw materials.
4. Conduct demonstrations <sup>xxx</sup> in the use of laboratory testing equipment for quality control <sup>xxx</sup>.
5. Perform such other activities <sup>xxx</sup>.

## II. CONTRACT TERMS AND HISTORY

The contract procedure was first initiated in February 1960. Preparations were made to leave in three months, postponed until September, December, January 1961. Finally a contract signed by the FNRJ was received late February 1961. This was the first indication that it was not an ICA contract. Modification and clarification was requested of ICA because it was signed by the FNRJ, ICA stated that the contract should be reopened upon arrival to clarify and modify as assistance was urgently required.

Upon arrival, after the trip to Madison Wisconsin and a briefing by ICA/W, the industry officer USOM/Y stated that "the contract was obsolete "to make myself generally useful" and "play it by ear". Upon asking for written clarification this officer denied the statement which is contrary to fact.



Later upon a visit to the TAA office with an assistant industry officer the contract was again brought up. The Yugoslavian counterpart stated that the contract was for six months subject to renewal at the option of the Vevče Institute as there was a question of competence of the contractor.

It was stated by the contractor that if there was any question of competence that the contract be terminated forth with and return tickets be provided immediately.

Furthermore, if the contract was for only six months that the TAA notify the contractor within 10 days or that it was for 18 months otherwise it was assumed to be for 6 months and not subject to renewal at anybody's option.

No written confirmation was ever received by the contractor tho the assistant industry officer reported by phone that USOM/Y had received such a confirmation.

The contractor then proceeded to Ljubljana with his counterpart. A program of activities was received by the contractor from the counterpart as was advance subsistence funds - one days travel allowance at 3,000 Dinars per diem. Program attached (Exhibit 1).

Upon arrival "on station" no provision had been made for living quarters and the hotels were full. At the contractor's suggestion a room was found at the Bellevue, a third class hotel.

As reported in the Monthly Reports of March, April and May, most of the contractor's work was confined to reviewing projects-in-process at the Industrijski biro.

A request was made to the counterpart for basic information so that some idea of the availability of raw materials, chemicals, existing facilities and projected new mills could be developed for a research program at the Institute.

To make this easier a questionnaire (Exhibit 2) was submitted. 17 months later no answer has been received. The blythe answer has been, to why the information has not been received is, that it was submitted to Belgrade for answer.





After insistent demand a laboratory worker was assigned at the Vevče laboratory and a program of cooking coniferous wood was started. For the want of a better objective, it was decided that it was desirable to try and cut the cooking time from 8 hours to 4 hours which was the planned schedule for the Donji Vakuf project. Some initial success was obtained, but when several errors appeared, repeat experiments failed. Lack of interest killed the project uncompleted.

From observation and study of such statistical information as could be obtained it is obvious that Yugoslavia is faced with a super abundance of Beech and a declining supply of coniferous wood. It is equally obvious that the demand for Beech lumber is limited. Thus, it is imperative for the pulp and paper industry to use more Beech or suffer from increasing shortages of pulpwood. Therefore a program of pulping studies using Beech is urgent.

The Institute was asked for a list of its past experimental programs so that a development program could be outlined. A two page list of publications, Exhibit 3, of its senior engineer was supplied covering many years work. From a planning standpoint the list is valueless, because the Institute has or should have done a great deal more, in fact none of its many current projects which were observed and their objectives were listed.

The obvious conclusion is that it wanted no assistance and would not cooperate. Finally action was demanded that a Beech cold soda program be started for all indications pointed to this wide gap in research.

The program was started using such fill-in time as was available. A special preliminary report was finally submitted. This experimental work shows that Beech cold soda pulp is as strong as spruce groundwood. However, because of lack of interest at the Institute and continuous stalling on the installation of centrifugal cleaners for a year, the work is incomplete and was finally dropped.



The Institute concluded several years ago that the cold soda process would not work because a mill in Denmark tried it and gave it up. No technical data or explanation was given. All of this in spite of the fact that Yugoslavian wood was sent to America for trial, equipment was bought in the USA and a mill is being built in Zagreb to use the cold soda process.

Several halts were also called in the program using Beech and shifted to Poplar. Aspen is judged to be the "wood of the future" by the Institute based largely on the Italian experience.

Yugoslavia has millions of cubic meters of beech now - Aspen is a plantation tree and ample supplies are probably a generation away as far as can be seen or determined.

Further experimental work was also done on a wide variety of agricultural wastes. A special report was written on this. A program was developed to introduce High Yield Sulphite and super high yield sulphite. No advice was ever asked for and only one result is partially known. In this result the objective was completely missed.

During this initial period the contractor asked to visit the various mills to see their operations, discuss their expansion programs and offer any assistance.

The answer was that the mills has no problems, did not need assistance, according to the Institute.

After 10 months USOM/Y - and TAA Belgrade requested a meeting wherein the resistance of the Institute was outlined and definite corrections demanded. The matter was placed in charge of Mr. Furlan, TAA representative of Republic of Slovenia. After several frank discussions with Messrs. Furlan, Koselj and Bonač, representing the Institute, a memorandum was prepared outlining past problems and future projects. Mr. Koselj as the president of the Paper Association was placed in charge of the contractor's work. The memorandum





(Exhibit 4) was agreed upon. The contractor was given office space, expert stenographic service was restored and a new counterpart assigned. Mr. Prelovšek, who worked in close contact with Mr. Koselj.

Just prior to the series of meeting a second schedule of activity was received (Exhibit 5) (January 10, 1962).

In connection with the second 6 months period of activities, as outlined in the contract, a study of the Institute's functions was to be included. Information was requested as of October 14, 1961 (Exhibit 6). The Institute replied somewhat later by saying that the Institute would supply the information when it had time. None was received. The project was dropped as a result of the Furlan's meetings.

From conversations with the Institute counterpart, it was appointed that the Institute was not a party to the contract. As of June 1961, they had never seen a copy. The contractor loaned his original when some action was demanded. Later on this counterpart reported that none of the "duties" specified were wanted and all the Institute required of an "expert" was someone who could obtain information and answer questions "if asked".

In preparation for the second phase - "study of the Institute" the contractor has obtained information from various pulp and paper research institutions both public and private so that organization, function, financing and training activities could be compared and suitable procedures outlined. This contractor has worked in or with many of these organizations in the past. Furthermore, the contractor was the original organizer of a joint research organization between New York State - the NYS College of Forestry and a world wide group of pulp and paper mills, the Empire State Pulp and Paper Research Associates (ESPRA)).

Since the reorganization of the contract under Koselj work has progressed - reports have been typed and distributed -



visits to paper mills have been made - discussions held concerning problems in operation, reconstruction - new construction and research.

Contrary to previous information, all of the mills visited have been most gracious, all have many operating and other problems and they have responded with such information as required in most instances. Many of the problems are economic or require equipment so that time way beyond the contract term will be necessary before they can be completed.

All mills of any size have been visited for at least one day - some where an intensive more detailed study was required have been visited for 3 - 4 days.

The reports have been typed and distributed, in addition reports, outlines - suggestions have been written and distributed on

High Yield Sulphite

Douglas Fir for pulp production

Gold Side Pulping Process

Alum. Power Grades: Quality and Collection

Included in the mill reports are suggestions for speeding up sulphite production, bleaching of groundwood - flow sheets for groundwood - high yield sulphite - elimination of shell or shadow marking - man hour productivity studies; basic information for a research program covering Kraft process viscose pulp from Beech.

Under the heading Performance - various projects undertaken will be detailed and their status reported.





## PARIS TO BELGRADE PROVISIONS

### Travel & Baggage

No specific information was received as to who or where the Paris - Belgrade ticket could be found. Air France stated that they were the agents of JAT, had no ticket and could not find anyone who knew of one. Confirmation of this was received from the JAT office in Paris. An additional ticket was purchased for the (Overnight) Air France called the schedule had been advanced 4 hours and there was a JAT office at Orly and that they had a ticket. Air Freight was delayed and if it had not been shipped direct to Belgrade trans shipment would have required several days delay.

Surface Freight was held on the docks at Rijeka because of lost papers. Again this was a direct shipment. What the delay would have been if it had been via Paris is required. Finally "Transjug" telegraphed USOM/Y trying to locate the papers and received word that the contractor was unknown at the Embassy.

The Customs Service refused to accept the terms of the contract on the ground that the TAA had not consulted them prior to signing the contract. The provisions were void. This pertained to the car after some four months delay the car was sold for a year retroactive.

Duty has been charged on books and any other material needed for the work in progress.



Stenographic service, etc.

This was originally provided by the Industrijski biro as the Institute had no facilities. It was shut-off in June 1961 because of cost to the Institute. As a result little was provided until TAA took a hand in the matter in January 1962. The Industrijski biro then took over again and results were obtained.









The extent of its financial support by the mills is unclear tho it is reported to be required to be self supporting i. e. it must obtain work or projects which will pay for its operation. Thus the existing mills may sponsor work - new investors and others may also sponsor work and pay for it.

As for the advising and training of Yugoslavian engineers as stated in the contract - the Institute apparently does not have a training function as it was operated during the contract period. Later on, when the building is completed and staffed it is supposed to give advanced instruction to university graduates.

The two senior engineers both with 30 years experience showed only casual interest in any work which was undertaken. The senior pulping engineer who was the operating head of the Institute never asked for any advice, discussed any current projects or their objectives.

The other senior engineer (the English speaking counterpart) arranged for such work to be done as was demanded. He was charged with the paper making problems of the Institute and as such had little to do with pulping. His questions mainly dealt with various paper - quality and conversion activities. Thus both senior engineers had full time Institute jobs and technical assistance was of low priority and an additional work burden to them.

When action was demanded, a skilled competent technician was assigned who showed considerable interest in new knowledge. He was later replaced by a junior engineer (University graduate 1961). This engineer while inexperienced was also anxious to learn and did quite well. Both of the above were not English speaking tho this proved no great obstacle. The latter began an English course.





These two men - one a junior engineer and a technician obtained some training and advice.

In addition a young woman engineer was also added to the staff. She like the young man also asked often for information or opinions.

Therefore all of the engineers available, interested or assigned were advised and trained to the limit of time and projects available at the Institute. This covered Cold Soda Processing of Beech, Spruce, Aspen woods and agricultural wastes and semi-chemical pulping of coniferous wood.

In the Industrijski biro the various project engineers were advised, flow sheets and specifications were reviewed when they asked for it. The processes involved were neutral sulphite - kraft - cold soda - groundwood. The species considered were Cotton stalks, Pine, Aspen, Beech, Fir and Spruce.

The projects were Sudan, Donji Vakuf, Zagreb, Plaški, Drvar, Drava.

The engineers involved and the contractor discussed each project and in most cases a memorandum was prepared, consisting of notes referring to specific blue prints or flow sheets.

During the first six months period intensive study and development was under way for a rice straw pulp and paper mill for Kočani, Macedonia. The contractor made available information on a similar project. However, his advice was not specifically asked for with this one exception.

An identical plant which had run 4 months and then put in moth balls was for sale in Valencia, Spain. The contractor was asked to find out why it was shut down,



the condition of the machinery and other pertinent information. The information was asked for thru USOM/Y Embassy channels. It was denied unless it could be proven that it was of benefit to the Institute.

It was actually a part of the Institutes counterpart work. However, the information was obtained thru private channels. The mill had been built for political purposes - it had met its production goals, the quality was good - there was sufficient equipment available for twice the production - the asking price was about 50 % of new equipment available for twice the production - the cost could be financed. Arrangements were offered so that the contractor could inspect the plant. Nothing further was ever heard of the matter.

Kočani is being built with new equipment.

#### Compliance

Advice and training were given to such engineers and technicians as were assigned for limited periods at the Institute.

Advice was given to the pulp and paper engineering group at the Industrijski biro as requested. As part of the visits to the various mills advice was given on pulping problems where these problems occurred.

It should be stated that there is also a pulp and paper school at Vevče and that Ljubljana University trains engineers for the paper industry. No arrangements were made to contact these schools.



## 7. Develop Plans for the Use of Domestic Raw Materials and Recommend Processes.

Shortly after arrival, the contractor requested information on the various paper making raw materials available - the quantities procurable - chemicals available - cost and plans for industry expansion so that plans could be made for any required research and processes could be selected using domestic chemicals to meet the expansion demands.

After repeated requests by the contractor and USOM/Y none of the information has ever been supplied.

### a) Wood

However, after intensive study of such statistics as the contractor was able to obtain and by such observations as could be made during limited travel, it is obvious that Firch is the predominant species available. It is believed to comprise some 52 % or more of the total standing forest volume. Because of the limited use as lumber and fuel the proportion is most likely to increase as intensive cutting of the choice Spruce, Fir and Pine continues.

As for Poplar which is judged by the Institute as the "factor of the future" a few small plantations have been observed along the Sauras-Salyredj railway and such parts of the Amudarya as have been travelled.

This species at least as it has been seen is 20 years away from pulp wood size if sufficient volume has been planted.

It is agreed by all that Populus is the preferred species of all hardwood or broadleaf species, but it cannot replace coniferous woods entirely.





Wood processing in the pulp mill wood varies. Paper is being used in limited amounts.

To be the "wood of the future" requires good land, fertilization, cultivation and 20 - 25 years plus long fibered Pine, Fir and Spruce to overcome and strength deficiencies.

Of the other species growing - Alder, Birch, Maple, Oak and Chestnut - each is limited to small volumes in scattered areas and constitutes a small source of supply not pulpwood.

Thus Yugoslavia is faced with a Beech utilization problem of immediate priority. Some Beech is currently used in sulphite mills for paper and viscose - more will be used when some of the new Kraft mills are in operation. Helpful as this may be the volume used will be small compared to that now standing and growing.

Beech should be adopted as the "wood of the future" and every avenue of cultivation should be fully explored with a determination to use it.

It poses no problem in Kraft - Sulphite or Neutral Sulphite processing for use in limited amounts for paper or for rayon production.

It cannot be used in the conventional groundwood process.

However, as a substitute for Spruce, Fir or Pine groundwood, cold water processing offers a method low in capital cost, as far as can be judged with meager information, low chemical cost and high yields.

Such pulps can readily be used in newsprint, printing papers and some lower quality writing papers with brightness values of 70 % or less.



... ..

... .. the contractor felt that Cold Soda ... .. should have top priority. The ... .., but the final crucial stages of cleaning and bleaching were never completed.

Thus the amounts which could be used for various ... .. of paper could not be determined and questions asked at the various mills could not be answered as completely as they should have been.

#### Waste Paper

Waste Paper (waste paper) forms the second major raw material supply in all major paper making nations. Some is used in Yugoslavia to a limited extent, some is reported to be imported.

From such preparations as were made, the quality is poor and some concerns were made concerning the high cost.

A special report was distributed concerning the quality - grading and collection. This was prepared with the hope that the suggestions would improve the supply. If so, possibly a de-inking plant might be justified to augment the limited waste paper supply.

#### c) Other Raw Material

As is amply illustrated in the literature, any plant that grows can be processed into pulp.

However, where wood is available, the use of other raw materials is seldom justified except for special purposes.





Economics is the deciding factor in most cases. Ingestion economics is probably no exception to the rule. There is no question about the abundance of straw and corn stalks available, and except for some special cases, these are not promising raw materials for the present. Until the wood supply is exhausted or some unforeseen raw material demand occurs, there will be little demand in the foreseeable future.

Of the other remaining plants - bristlers, cotton stalks, opium poppy stalks, castor bean stalks, sunflower stalks etc. so little is grown in terms of pulp supply that they do not seem worth consideration tho extensive research has been conducted at the Institute.

Flax and Hemp fiber can assume some importance as cotton or linen rag substitutes for air mail stationery, cigarette paper, currency paper and other thin papers.

These fibers are now used by Rijeka Paper Mill with excellent results. Their increased use at Radeče should be considered.

#### d) High Yield Pulping Procedures

Because of the apparent shortage of coniferous wood building up for the future, high yield processing has been suggested for Medvode. It is also under consideration at Vidar-Krško to the extent that bids are being solicited for equipment.

The objectives are worthy - to obtain yields of 60 - 65 % at brightness of 60 - 70 % compared to the present 42 - 45 %. There are some new techniques in which yields of 80 - 85 % are possible. A preliminary outline for high yield and ultra high yield development was distributed.



The only research that is known to have been done on this subject carried the bleaching thru 3 stages to a yield of over 80 %. The yield dropped to 45 %. The main accomplishment was to substitute chlorine for sulphur consumption. Thus the primary objective was completely missed or negated.

### Compliance

In spite of the denial of definite technical and economic information required to properly make suitable plans, a program to utilize Beech was outlined. However this program was carried to a point where all indications point toward a possible sizeable increase in use for a variety of papers and boards.

Conditions beyond the control of the contractor prevented the completion of the project. A preliminary report of results on Beech - Poplar and Spruce Cold Soda processing was distributed.

A report on wood should be the second largest source of paper making fiber - paper stock - was distributed.

A report on the use of agricultural waste was distributed pointing out the economic problems involved.

A development high yield and ultra high yield sulphite program was distributed.

No specific recommendations for processing can be made because of the denial of information and the failure to make adequate facilities available by the Institute.

It is most likely however that the Yugoslavian "wood of the present and future" is Beech and its use can be immeasurably increased by the cold soda process and to a lesser extent in the Kraft and sulphite processes.



Assist in the Choice and Installation of Equipment for  
the Manufacture of Above Pulp and with Its Running-in  
Operations

The Institut papirje Vavča is a research laboratory  
concerned with the construction of an engineering, design  
and construction for operation. Therefore is not concerned  
with the running-in of its equipment.

However, the Institute has one procurement program of  
its own. The purchase of an experimental paper machine  
for installation in a future second building to be  
constructed on the new site.

The specification was prepared according to the  
requirements of the Institute. This machine was to be  
purchased by the USSR under a \$ 44,000 PIO/C. The  
specification was sent to likely suppliers in the USSR  
and Germany. Two American firms responded - one of  
the firms has supplied several small machines;

University of Maine, University of Western Michigan  
and others. The price per specification and approximately  
\$ 60,000 as one of their standard machines which would  
be suitable for experimental purposes.

The German bid was approximately \$ 100,000. As a result  
the Institute countered with a proposal to purchase  
about \$ 44,000 worth of parts. From these parts the  
machine could be designed and built in Yugoslavia to  
meet the requirements.

PIO/T. was in service. This latter procedure was  
not recommended on the ground that it did not meet  
the PIO/T purchase descriptions and designing a machine  
from minor parts was a hazardous procedure. .  
The \$ 60,000 paper machine was recommended as adequate  
for the purpose.





It is understood that USOM/Y increased the PIO/C to \$ 60,000.

No "running-in" was possible as delivery will not be made before the termination of the contract and the building will not be completed. Construction of the paper machine building is not contemplated until after the present building is finished.

The Industrijski biro on the other hand is actively engaged in the preliminary design, engineering problem construction and supervision of new construction and modernization of pulp and paper mills as well as many other types of industrial processing.

As has been previously mentioned, the pulp and paper engineering groups asked for reviews of flow sheets, specifications and construction drawings with comments on the processing and equipment to be furnished by the prime contractors.

In most cases as a result of these reviews, suggestions were made concerning the arrangement of equipment and its choice for the purpose of simplification, ease of operation, maintenance, repair part stocks and to save capital costs.

These suggestions were presented to the Industrijski biro and to be passed along to the prime contractor as desired. In two cases the prime contractors refused to make changes. The apparent reasons were that the contractors were also the prime manufactures of the equipment as well as the designers of the plant and did not have a license to make the larger size equipment recommended or did not make the equipment at all, and would not buy it from others or were not familiar with modern processing and would not change without voiding the performance guarantee clauses.



was required with the facilities operating equipment  
for the purpose of the project from American  
View. It was not the duty of contract suppliers  
to provide technical assistance, including the purpose.  
The only technical information required was old. It  
was not known in order to be placed as a result  
of the project in "running-in" or deliveries having  
been made or installations completed; no assistance  
could be given.

In the event the bill was concerned, advice has been  
given to the various discussions, but there has been  
no further plan to complete any project.

#### Conclusion

1. The contract supplier device has no function in the  
case of equipment for commercial operation,  
and the assistance was impossible.

2. The contract supplier has no function and has  
been given the same assistance as requested.

3. No assistance in "running-in" was possible as the  
length of contract was shorter than procurement  
time of equipment deliveries made.





## Summary of the Final Project

As no pulp projects were completed; no variations of wood pulp qualities could be made on the basis of laboratory findings.

The cold water process being installed at Zagreb Paper Mill will not be in operation before the contract expires.

In the review of the Sremska Mitrovica it was pointed out that the use of 75 - 85 % poplar wood posed some difficult production problems.

The Canadian newsprint producers have tried to use poplar but have been restricted to about 18 %, the balance spruce and fir.

This matter was also discussed with the operators at Videm Krško who confirmed this fact from their own operations.

It was suggested just before the Sremska Mitrovica plant got along too far, some commercial development be carried out to confirm the maximum speeds, maximum amounts of poplar and the effects on quality of product. This work to be done at Videm Krško.

The suggestion was turned down by the Institute as unnecessary. The concern was that it would interfere with Videm production and furthermore if Poplar did not work Spruce and Fir would be used instead.

A young engineer from the plant came to the firm to discuss the problem. In the discussion it was pointed out that cold soda poplar pulp might be the answer. They stated that this process was contemplated for the second stage expansion program.

The project engineer wanted to hold up the project pending further experimental work but was over-ruled because the machinery orders had been placed.



### Compliance

General suggestions were made that increasing concentration of Beech and Poplar were possible in a general way. Closer approximations based on laboratory determinations could not be made because of forces beyond the control of the contractor.

Commercial cold soda process evaluations could not be made until the first commercial plant is in operation, sometime after the contract expires.

There was no valid reason why commercial evaluation of poplar pulp processed by conventional means could not have been carried out to establish the limitations of its use for newsprint.

### B. The Second Six Months Period

The first six months activities required about 10 months at which time the activities were reviewed by TAC and USOM/Y at Belgrade and the conferences with Messrs. Pichler, Koselj, and Boneč were held.

As outlined in the memorandum (Exhibit attached) the following changes were made because of time shortages - 8 months remained.

1. No further expansion development and refinement of plans and recommendations was possible. Dr. Josif Koselj took over the planning of the contractors activities and Ing. Pralovšek took over the function of the counterpart.

### Compliance

The requirement was dropped - no compliance necessary.



## Section 10. Forest Data Collection Institute

This Institute appears to be somewhat different in its operating structure than some of the other industrial research institutes.

The difference so far as can be determined is that it is industry supported and operates across the individual republic boundaries. Thus its membership or sponsors represent Slovenia, Croatia, Serbia, Bosnian and probably Unm. Rep. and Macedonian pulp and paper mills **when in operation.**

As an industry data institute it receives no governmental support or subsidy from the individual republics or the national government.

Apparently the sponsors do not finance the overhead and insure that the Institute be self supporting. As a result the Institute is forced to take on projects which add little to the general economic welfare of the nation.

Such projects are those using exotic plants, such as Manihot, Cotton Stalks, Poppy Stalks and to mention projects which were observed. Thus time was consumed which might have been spent on problems which would be of more lasting long range benefit.

Unfortunately the Institute's new building has never been completed and apparently is slowed down because of limited financial resources. It is understood that the sponsors have limited their financial support such as it is to this building project.

As a result of this limited support the present Institute is in complete arrears - some of its equipment is in storage and the installation of the paper machine years away. No provision has been made for this machine in the new building under construction.





Application for a loan was denied by at least one bank.  
An application was also made to the Republic of Slovenia  
Research Council for a loan - status unknown.

As far as can be learned, the Institute was connected in  
close connection with Ljubljana University, offering  
advanced study in cellulose chemistry and pulp and  
paper manufacturing.

From observations at the various member (sponsor) mills  
and the contemplated expansion programs, a central  
research station in combination with some academic  
function seems warranted.

The size of the buildings, the extensive equipment  
supplied by the American people and a proposed staff  
reported to be about 40 indicates a sizeable operation.

Therefore in anticipation of the second requirement  
the second six months period, information was consis-  
tently asked for during the first six months. It was  
formally asked for in a memorandum (Exhibit 6) in  
October 1961. No information was ever received.

In the contractors opinion and by observation and  
comments obtained, defining the role of the Institute  
could have been the most important requirement in the  
contract.

Such an Institute by following well defined functions  
in applied research, the translation and distribution  
of foreign research information and some training  
activity could be of immeasurable benefit to Yugoslavia.

Theoretical research seems for sometime an unnecessary  
luxury and should be eliminated.

So far as can be determined, there are many unsolved  
problems and questions unanswered about the Institute.



These briefly are:

1. With the size of the facility and contemplated staff will the industry finance such an organization.
2. With only an anticipated 500.000 tons of annual production is such an organization necessary.
3. With limited production facilities therefore requiring a limited number of engineers just what is the training function to be.

Possibly this has all been worked out, but if so why does the present operation have to earn its own way. Why is the present building not being pushed to rapid completion ?

If central research is the plan then why are the new mills equipped with their own extensive laboratory facilities. This seems a duplication of equipment and efforts.

This is further complicated by the organization of a rival research institute at Banja Luka whose dedicated purpose is to concentrate on applied research and to make individual mill research unnecessary. The Banja Luka Institute claims the financial support of the Bosnian and Croatian mills, the largest concentration of the Industry.

Thus it seems vital that the Institute papirja Vevče should know where it is going and how. Finding the answers was contemplated in the contract.

However, the Institute staff failed to provide the information and the subsequent meetings on the contract with Koselj and Furlan cancelled the requirement.

#### Compliance

Requirement cancelled.





3. Visit Specific Paper Mills and Offer Advice in the  
Reconstruction and Design of Facilities for the  
Introduction of More Suitable Processes.

Upon arrival the contractor asked his counterparts to make arrangements to visit the various mills. The purpose was to obtain some background for development planning for applied research and to judge which techniques were in use and consider possible improvements.

The request was denied on the ground that the mills did not want assistance, had no problems and were too busy.

When the new mill at Belisáe started up, it was obviously in production difficulty and the contractor offered his assistance and requested permission to visit the mill. This was also denied on the ground that the mill was under guarantee by the design machinery supplier even tho a research project was in progress at the Institute, cooking spent chestnut chips. About one year later, when the contractor visited this mill, it was apparent that the designer-supplier had done little or no development work and was not familiar with the end product requirements. This is most surprising as the designer-supplier of the pulp mill has a world wide reputation for excellence.

The attention of Koseij was called to the reported **attitude** of the mills and a correction of the condition was promised.

Some 10 months after arrival a visiting program was set up which has been carried out during the first six months of 1962:



The mills visited are:

1. Vidan Krško
2. Vevče
3. Medvode
4. Loličeva
5. Badoše
6. Sladki vrh
7. Ceršek
8. Podvelka
9. Prevalje
10. Beliča
11. Zagreb
12. Rijeka
13. Maglaj
14. Banja Luka
15. Prijedor

Observations and comments on the operations have been prepared and distributed on each of the mills with the objective of comparing them to American and Canadian operations from the techniques employed, productivity and general conditions. Where expansion programs were under consideration, suggestions were made on techniques to be considered, possibilities for increased productivity etc.

These studies were naturally brief because of the time available. Normally the contractor in making such studies would have spent several months at a plant developing improved flows, quality, obtaining equipment quotations, relating the improved techniques to cost reduction, increased productivity and higher quality.

However, even brief studies as have been made can guide the thinking of the management in future improvement programs.



Any comparison of the observations observed must be very general. These observations could be that productivity is low, the work force is too large, that necessary work paper methods are comparatively slow and in comparison to North American practices.

In the older mills some machines are obsolete, even this, only 30 years old need extensive maintenance and modernization. Some management tools seem to be missing for efficient cost control.

One point however is most apparent, in the old mills quality of product is good quality and wide diversity of product with antique equipment. The quality of new products is low in some cases, on a comparison basis, often caused by factors beyond the control of operators.

Certainly there is plenty of opportunity for improvement in efficiency, productivity, quality and cost and by obtaining an aggressive management.

### Conclusions

The collector has visited most of the present pulp and paper mill operations after arrangements were made some 10 months after arrival.

In most cases his comments and observations were gratefully received for what they were intended to do - offer constructive criticism.

It is now up to the management to realize the suggestions.

This collector however feels that a great deal more is to be done. The world market for pulp and paper is still growing and the demand for pulp and paper is increasing. It is hoped that the collector's suggestions will be of some benefit.





Several more years could be devoted to further work on this phase to carry it to a successful conclusion.

## C Third Six Months Period

### 1 Advise Regarding Long-term Plans for Developing Production of Paper and Cardboard into Packaging Materials

One of the important points of this requirement was the answers to the basic information questionnaire which was not answered.

The contractor upon receipt of the PIO/Ts in Washington stated that in his opinion this phase was the most important and should have been included in the first six months activities.

This phase is "Market Research" upon which all production, modernization and future expansion rests as a foundation.

Pulp and paper is a service industry for its products as such are valueless unless some one converts them into a useable product or condition; to write on, print on, wrap or package some commodity.

The demand rests largely upon others. All of the per capita consumption rests solely upon the ability of the industry to meet the requirements of its customers the **printers** and converters in the grades, quality and forms which these customers demand. These paper users in turn must meet the demand of their customers who in turn fulfill the end users needs.

In some cases, grades of paper and their consumption rests upon the economic status of the ultimate consumer.



For example if a potential customer does not have surplus funds to buy a new paper, a magazine or book there is no need to print the book, magazine or newspaper and therefore no demand for these grades of paper.

In the packaging field unless the customer can afford to buy packaged foods or other commodities or paper saves in distribution costs there is no demand for packaged items. Packaging costs money and unless the cost can be absorbed in cheaper distribution (more efficient handling, shipping or sales) it must be passed along to the consumer.

At the present time packaging is in a transition stage and paper and cardboard are facing fierce competition for the first time in their history.

During the last 30 years it was the aggressive competitor against textile bags, wooden boxes etc.

From now on, paper and paper board is up against unrelaxing price and new product research pressures from plastic films, metal foils and bulk shipments.

Observe the packaging in any Yugoslavian supermarket and note the plastic bags used to replace paper.

Watch any major construction job and note the bulk delivery of cement. It is only a short time away before sugar, flour and other bulk commodities are shipped in a similar manner. Germany, Italy, Canada, and the United States can all serve to illustrate the future competition and trends.

President Tito has expressed himself well and clearly on the agency of "Market Research", and his words apply equally well to paper and paper board as to steel, glass or any other commodity.





However, so far as contractors can determine Yagcioglu has ignored "market research" and can in the near future find that it has surplus capacity for products which no one needs. In the paper field these items can be in wrapping paper, multi wall sacks and some types of bags. Thus "Market Research" is urgent and should be of foremost priority.

Unfortunately no information was received to conduct such a study, no interest was apparent in such a study and as a result of the conference with Koceli and Terlan the project was dropped.

#### Compliance

Project dropped, the Market Research is the foundation of all modern industry and supporting activity.

### 2. Offer Assistance in Organizing Facilities and Training Activities at Institute.

This phase is a carry-over from the second six months and was cancelled.

#### Compliance

None.

### 3. Advise Existing Mills in Reconstruction, Future Processing, Use of Domestic Raw Materials

This phase is a carry-over from the second six months activities.

#### Compliance

Commented upon under second six months activities.



Product Development and Institute in the Use of  
Laboratory Testing Equipment for Quality Control.

The Institute has received as a gift from the American people an extensive collection of laboratory pulping and paper making equipment. In addition, it has also received practically every known instrument for the testing various paper and pulp physical characteristics. Also included is a wide variety of chemical laboratory analytical equipment.

Thus the Institute has available for use one of the finest collections of apparatus available for pulp and paper physical and chemical evaluations.

From observations, the staff of technicians employed as well as the senior engineers are well versed in the use of this equipment so that little instruction or demonstration is necessary.

In two cases assistance was asked for, in each case, it appeared that the problems were those of difficulty in translating and understanding the manufacturers' instructions. In each case the advice was given and the problem solved.

In as much as most of the equipment installed is common to the pulp and paper industry on a world wide basis and much of it is covered by the official Standard Methods of the Technical Association of the Pulp and Paper Industry of which there are 11 individual and one corporate member in Yugoslavia, instruction in use is unnecessary.

Such equipment which is not standard in TAPPI procedure is covered by Swedish, German, French or English testing procedures.



The Institute therefore has available the latest scientific methods for its use as required.

In the conversations and review of the contract with Josely and Durian, the requirement was considered to be of minor importance and cancelled.

At this point it might be well to comment upon quality control. The Institute apparently has a quality standardization program for the whole industry under consideration.

The objective is to standardize the quality of all grades produced by all of the mills.

The contractor was asked on several occasions to obtain the American paper standards. It was pointed out that there are no generally accepted U.S. standards applying to all grades of paper and that under a free enterprise system with free competition no standards are possible. Each mill therefore can produce any quality at any price that it chooses.

The market or the consumer are actually setting the standards by their purchases.

There are some exceptions of course and these were fully explained. These exceptions are:

1. Standards set up on papers by the purchaser as minimum quality requirements. Formally they are set up by the large buyers: Insurance Companies, printers of large volume magazines such as Time, Life, Reader's Digest etc. American Telephone, E.I. du Pont, General Electric and many others purchase on specification covering highly specialized technical papers, X-ray papers, cable wrap, transformer insulation, insulating cards etc.

In some cases these papers are included in the standards of American Society of Testing Materials and they are not necessarily the standards of the individual companies.





2. standards set up by the various Governmental agencies who purchase solely upon bid. The chief and best known agency of this type is the U. S. Government Printing Office. These specifications cover every grade of paper purchased by the Public Printer and over the many years of development are judged to be adequate for the purpose. Not only do they include paper quality requirements, but trimming, packaging and shipping instructions in considerable detail. One clause provides for inspection during manufacture.

Other similar specifications are used by the U.S. General Services Administration and by such cities as New York etc.

A copy to the USGPO specifications and 2 sets of standard samples was obtained for the Institute's guidance.

One other governmental agency has a specification of world wide importance. It is the U.S. Treasury's specification for Standard Newsprint. First developed in 1914 and amended thereafter many times.

This is a maximum standard as it is used to define newsprint for duty-free import into United States. As a result it serves generally as the specification for the Canadian and Scandinavian newsprint industry.

3. Standards set up for Inter-State Commerce.

These standards were set up by joint action of the railroads, motor transport, shippers, box makers and paper manufacturers in the case of paper and paper board and standardize shipping containers.



They carry the full force of Inter State Commerce Commission regulations. Paper packaging is controlled by Rule 41 of the Uniform Freight Classification.

Every commodity is listed, the manner of packing and specification is detailed.

Many ocean carriers subscribe to its conditions. From observation Rule 41 is commonly accepted in Europe because the box makers certificate is often found on European shipping cases.

In addition to shipping cases, multi wall sacks, fiber drums and pails are included.

A copy of the Uniform Freight Classification including Rule 41 was obtained for the Institute. Yugoslavia could well adopt such a rule for its shipping containers, because it is forced to comply on any shipments exported to the United States and Canada.

#### 4 Individual Paper Manufacturers Quality Specifications

Each individual U.S. and Canadian mill has its own quality control system and standards. These of course vary from mill to mill grade to grade.

The purpose is for cost control and uniformity of product with the end result of customer satisfaction.

One mills system was outlined in the Vevče Paper Mill report. It was included for the guidance of setting up its own quality control system.

Videm Krško has a quality control system in operation. Possibly some of the other mills do likewise. They control its raw materials, production and quality.





Specifications set up as Trade Customs. Down to the years certain trade customs have been developed which have assumed the weight of specifications.

The main ones in force and generally accepted are the standard sizes and basic weights and tolerances for weight, thickness and finish in addition to some tolerances.

These "trade customs" have been developed by the Trade Associations and often referred to as "trade practices" by the U.S. Dept. of Commerce.

These "trade customs" have been calculated from metric measurements and are available for distribution in Yugoslavia.

Working in the "Trade Customs" prevents a customer from buying outside of these accepted practices, as far as Yugoslavia is concerned. Uniform quality specifications can be used as a waste of time and labor for no useful purpose.

The adoption of the U.S. Treasury's newspaper specification could raise the level of quality of paper in the Yugoslav newspaper and establish standards for either domestic use and for export.

The adoption of Rule 41 would do much to increase the quality of shipping boxes and multi-wall boxes with resulting savings in shipping damages. It would make one uniform specification for domestic and export packaging.

The adoption of one printer of the insurance company and one reference.

There seems to be a need for the Yugoslavians to adopt "Trade Customs" for internal consumption possibly not the same as American except in general but in close harmony with European practices.



the while no, having close individual control  
and control should be given as required,  
control should be maintained.

#### Compliance

Compliance with the above was given as required,  
and the special control and procedures were applied  
as required.

The project was finally dropped as it was of no  
importance as the requirement was defined.



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Saw mill waste likewise must be sorted for quality of the  
species in the saw mill. Either all saw logs which waste  
is from pulp should be sorted prior to sawing or the waste  
barked after sawing, otherwise the waste is fit only for  
fuel wood.

It is reported that some mills operate on a cycle basis  
sawing all coniferous wood at times - all broadleaf at  
other times - so that the supply flow by species is not  
constant. Obviously storage in the material flow is  
necessary if a pulp mill is to operate efficiently and  
is to meet the production demands of the paper mills.

At present saw mill waste is banded with wire ties  
and can be sold by the saw mill either as pulpwood or  
fuel wood.

More uniform flow would result if the pulpwood demands  
were closely scheduled. Better handling methods could be  
developed by on-the-site chipping - outside chip storage  
and more efficient loading of cars and trucks to increase  
the weight of the loads. Better quality chips could be  
a result.

Numerous systems for handling, shipping, barking and  
chipping both pulp wood and saw mill waste are available  
to meet any set of conditions.

As far as could be determined the Yugoslavian pulp  
industry has not adopted any of those that they are in  
use in North America, Sweden and France.

As far as the availability of wood is concerned, this has  
been covered at some length in other sections of the  
report.

For the Yugoslavians Yugoslavia is faced with a growing  
shortage of the preferred species, spruce, fir and pine.  
Unfortunately, these are the most important species in  
demand for lumber as well.







...the way this gives the ... the latter will ... product ... some ... the ... that ... is ... the ... the ... construction ...

The ... of a ... in a ... such as ... is limited to the use of ... as ... is an illustration of a ... based on ... Certainly the ... is ... and it is ... with long ... must be purchased.

... is another plant in which the planned ... is limited.

... is another.

All of these plants are relatively small and ... is restricted by low availability of materials.

### 3. Transportation

The transportation problem is unique because of the ... narrow gauge ... lack of high speed ... and rugged terrain.

As a result ... of the ... requiring ... a ... costly operation.

It would seem that some better choice of sites could have been made by looking ... the gauge ... of that ... could be made without ...

... is another - driver - ... and ... some others are examples of this condition.





There is no question that some sites were chosen to make work and spread industrialization into the more remote areas.

Paper-making is an industry requiring a high degree of skill acquired only by years of experience and training.

As a general rule, remoteness, lack of cultural benefits will not attract the skilled labor nor the technicians or engineers required as long as they can find employment else where. Extra compensation - extra benefits are most often required to attract the skilled personnel required, all of which adds to the over head costs.

Some of the new mills may be faced with a difficult recruitment problem. One large mill probably already suffers from this problem.

### 3. Building Conditions and Area

While specific location within area can often be corrected many possible locations have problems of nature - earthquake, flood, wind and unstable terrain which can eliminate certain sites.

### 4. Power

Yugoslavia is blessed with ample electric power resources and a constantly expanding power grid so that most of the industrial areas can be easily reached. There may be some power problems in the remote areas.

Coal however may pose long distance transport. As a transport problem coal can weigh from one half to an equal weight of the paper produced.



## 1. Effluent Disposal

Regardless of the process used, effluent must be discharged. Regardless of the recovery system, some effluent may be obnoxious therefore dilution of the effluent is vital.

The dilution factor of course varies by the process used and the downstream use of the flow and the volume flow rates.

No obnoxious conditions were observed because most mills were on large rivers with large flows.

The question of dilution can arise at head water sites. The decision then must be made as to whether industry is more important than fishing or tourism. The merits of each case must be carefully weighed.

Of the many other factors involved - market research has been commented upon elsewhere.

Plant Size and Labor Productivity seem most important in Yugoslavia. While there is no question that some small mills can be profitable to meet domestic requirements if high prices can be obtained in a controlled economy.

In export it is another matter. Plant size or capacity and the capital cost of the plant become extremely important.

So far as is known the optimum size of pulp and paper mills for Yugoslavia has never been determined and as a result many small units have been built which may restrict their competitive position in export or preclude their ability to compete internally.

No present mill or one under construction approaches in capacity the mill capacities required to be competitively profitable in North America.



For example few new mills in that continent would be considered with a capacity of less than 300 tons per day and most would be built for 500 tons to reach the minimum capital investment per daily ton of capacity.

The present and projected units in Yugoslavia range from 35 - 125 tons per day.

While some factors such as the cost of construction labor are cheaper in Yugoslavia than elsewhere, construction time is longer, more men are needed etc. so that some of the Yugoslavian costs advantages can be cancelled.

Without detailed study and determination, it however seems likely that minimum size pulp and paper operations should be designed for at least 150 tons and possibly 200 tons per day if low cost paper is to be available for export or domestic consumption.

From observation and study a very low labor productivity is noted. In general, at least three, sometimes four and in some cases more men are needed than in North America.

The reasons are many but among the most important are slow speed, narrow machines, in some cases many small units, where fewer large units would be amply suitable. In some notable cases it is obsolete equipment, lack of proper material flow, manual handling, automatic control of operation.

The end result is that with the high capital investment required, the low productivity obtained, the Yugoslavian worker, regardless of work classification, is destined to be paid low wages, if his product is to compete.





## 2. Plant Location Problems

In the contractors travels and consideration of new projects it has been noted that plants seems to be located on region or republic basis, and some of the commonly accepted criteria used for choosing plant sites is often ignored.

In several cases the plant sites chosen have imposed unwarranted economic burdens on the operation.

Among the economic factors which must be considered in any choice of site are:

1. Water - quality - quantity
2. Raw material - availability - suitability
3. Transportation
4. Availability of skilled labor
5. Building conditions and area
6. Power
7. Effluent disposal

To the above must be added the products to be made as developed by the Market Research, economic factors governing plant size, labor productivity, labor turn-over.

### A. Water Supply

So far as is known all of the mills located on main rivers have ample supplies of water under any conditions of flow.

In some cases water treatment is required for silt removal, in other cases there may be streams where treatment is unnecessary. Iron may be present in some streams which creates a color problem.

In some of the more remotely located mills on the head waters of rivers - water supply could be insufficient during droughts.



The purpose of the program, the equipment and the  
method of construction, the specifications of several pieces  
of equipment and the method of construction of these pieces  
and the method of construction of these pieces.

The procedure is as follows: The idea  
of a project for a new plant or building in some organization  
such as a political district, bureau, forest industry  
or any other organization and if it is a new project  
the above organization must be defined as the "proposer"  
of the project.

Apparently the investor makes application to the Investment  
Board or other planning agency for permission to proceed.

As far as most construction are unskilled in  
manufacturing an organization such as the Industrial  
Board is brought in to see as a consulting engineering  
firm to prepare the necessary reports.

These reports are of the following kind: depending upon the  
requirements of the local and can cover the economic  
factors as well as the basic engineering studies of  
capital costs, production, cost of equipment, etc.  
Usually a specification is prepared for circulation to  
prospective bidders.

The document specifies the size and types of all major  
items of equipment, materials of construction, flow sheets,  
a plan of the plant etc. It gives the  
actual expression that all design work has been completed  
and the prospective contractor needs only to supply the  
equipment.

Further, when a bidder appears with quotations for  
equipment, the negotiators point out that what is wanted  
is a complete plant or a turn-key basis with suitable





...of the quality and quantity of work.  
...of the quality and quantity of work.  
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...of the quality and quantity of work.

In fact the specifications are not specifications at all, but merely a starting point for exploration of the project with bidders.

A great amount of time has been spent preparing this document, calculating capacities, preparing flow sheets, giving lay-outs which may not have any influence on the final result.

In reality the prospective bidder in order to make a satisfactory bid, will have to come to Yugoslavia, study all the details, then return to his home office and before he is asked, make up complete bill of materials, price each item, add engineering fees, costs of construction, supervision, contingencies to cover uncertainties, rising prices, instruction of workers and then a profit on top of that.

All of this is a sizeable undertaking, costing considerable money and time on the part of the prospective bidder solely on speculation of obtaining an order.

This method of asking for bids to supply complete plants from a machinery manufacturer demands that each manufacturer covers everything that is required, so everyone is satisfied. The bidder must buy a great many items on the outside market obtaining discounts or adding purchasing commissions.

In some cases the price bill and order will cover the entire cost of the plant. In the case of delicate work where special supplies are required the price bill and order will cover the entire cost of the plant.





Furthermore, as the bid is competitive, he will choose items on a basis of price alone.

There is every indication that advanced techniques, equipment design and operating know-how are lacking.

In time of wide pulp and paper expansion such as is occurring in Europe now, many of the major suppliers will not bother with such costly bidding procedures and thus eliminate themselves automatically.

As a result the smaller, less skillful concerns or those machine shops trying to gain a foot hold in the paper industry machinery business enter the competition. The results have not been too satisfactory for obsolete equipment is often installed, excessive or over design is common or slow machines are included, a disastrous situation for efficient long term operation.

The contractor was asked for advice and assistance in obtaining bids on the above basis from American firms. Specification were sent to a member of top machinery suppliers and also to a group of consulting engineering or construction firms. The results were negative. In general the comments were:

a) Machinery firms - Too much detailed design was required and too much outside purchasing was required to make the order worth obtaining. The cost was too high to obtain this information solely on the speculation of getting an order.

b) Consulting Engineering Firms

The processing, detailed engineering, the choice of equipment has been made by someone as is outlined in the specification. We are not interested in acting as purchasing agents.



c) Construction firm

Our business is the design of plants and the construction thereof. The design has been frozen by the specifications so our know-how has been eliminated. The construction, our main business will be done locally. We have no interest in this project.

Such a procedure is hardly realistic if modern processing techniques and efficient operation is required.

The Yugoslavian paper industry and the various sponsors if they want the best have got to make a change in procedure and must choose the procedure they want to follow:

- a) Give the complete job and whole responsibility to a firm such as the Industrijski biro. They in turn will take the detailed design, choose the equipment on the basis of highest efficiency from a large number of suppliers based on quality as well as price, design the buildings, supervise the erection, installation and start-up.
- b) Hire a foreign consulting engineering firm to do the above on a fee basis.

In either choice, the firm must be experienced in pulp and paper mill design, construction and operation with full knowledge of the latest techniques or obtain in their experienced consultants and have no conflict-of-interest by a connection with any supplier anywhere.

There is another problem of procurement which needs study. In 13. 12 cases, where a foreign loan is granted for a specific plant. In two cases, that are known, the loan of country, has chosen its own instrument for the execution of the project. In a review of the





...office of equipment, equipment, too, for  
savings in ... office ...  
... office ...  
... office ...  
... office ...  
... office ...

It would seem that in the future the ... (the ...)  
should have some rights in the office of ...  
equipment and processing. After all, ... is  
expected to repay the loan in full and interest ...  
and should not be penalized.

#### General Observations on the ...

Observations and comments have been made on most of the  
... and reviews have been made on some of  
... and projected.

In general, some of the ... have one disadvantage -  
a great portion of the equipment is very old, small and  
obsolete. They suffer from a failure to ...  
... over a very long period. 50 years in some cases.  
To desert a lot of this equipment is beyond ...  
... and should be ...

On the other hand it is in these ... that the ...  
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In general, the ... are ...  
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expansion and resulting shortage of skilled managers.

Only time, intensive in-plant training and careful selection can overcome the shortage of skilled managers and other personnel. Only aggressive production drive by skilled personnel can partially overcome low capacity.

In the future, expansion should be concentrated in speeding up and increasing the productivity of the present operations. There seems little economic justification for more new small 100 ton or less per day units.

A comprehensive analysis of the pulp and paper demands for domestic consumption and Yugoslavia's place in export would have shown that there are probably only 4 - 5 excellent pulp and paper mill sites in the whole country. These sites would be along the Sava River or its main tributaries where wide gauge railroads connect with the narrow gauge lines.

These new mills would probably have been 200 tons or more per day designed for efficient low cost operation. Such operations would have provided an abundance of low cost paper for either domestic or export.

As the present situation now stands utmost effort must be directed to cost reduction by more productivity, elimination of waste, excessive manpower, tight management control and improved raw material quality.



## 5. Knowledge and Training of Engineers

So far as could be determined the older engineers have excellent basic engineering educations, some have had the opportunity to study in Germany at the Technical High School at Darmstadt, some in Graz and at Grenoble, France.

ICA has sponsored many pulp and paper engineers to trips to European countries and some for American tours for observation.

Yugoslavia has followed closely over the years German practice and technology and in the contractor's opinion this technology at least so far as observed in Yugoslavia is not as advanced as it should be.

So far as adoption of American practices is concerned, very little or none has been noted either in operation or research.

Some of the reasons are that the travel in America has been too fast over a 3 or 4 months period - too many mills were seen over too large an area. Also the inspections were largely confined to the largest installations which in most cases cannot be compared to any Yugoslavian operation or the time at any one large plant was too short to absorb much which might be helpful for later application.

As for the younger engineers, it would be judged that they also have received a good basic engineering education. However it is probable that the Universities lack modern teaching equipment.

A case in point was a visit to the Ljubljana University Chemical Analysis Dept. For the number of students taking the course in analytical chemistry, the space and facilities were inadequate. The equipment was very elementary, similar to that which might be found in





a beginners' course in an American high school (Gymnasium).

It would seem that as the foundation for the future Yugoslavian industry rests upon these young engineers, modern equipment and techniques are vital in the teaching programs on the University level.

So far as is known, few if any of the younger men in the pulp and paper industry have the opportunity for advanced study preferably in the United States. Such study if possible should be concentrated on practical operations rather than on the theoretical.

It is also noted that some young engineers lack practical experience in the mills even tho some hold supervisory positions. Most American Universities require their engineering students to work during the summer vacations in industry. All who specialize in the pulp and paper industry must meet this requirement for graduation.

Preferably the under graduates should work directly in the maintenance department, on the paper machines, in stock preparation, pulp mills etc. as assistants to the skilled employees.

Thus they acquire practical knowledge, learn to take orders and obtain an understanding of the working conditions and workers' problems for later use as they move up ward.

Upon graduation many start even more intensive in-plant training, working thru all of the various departments before starting up the ladder of promotion and responsibility.

This procedure would apply regardless of whether the new man would concentrate on research, operation, sales, engineering or other phases of management.

Yugoslavia could well adopt such a system. Theoretical education is not enough to command the respect of the skilled workers. In fact it may do the opposite.





In a dynamic industry such as the pulp and paper industry where more new techniques have been developed since the war than in its previous history, it is vital that careful intensive and continuous study be made of the advances in world by the young and older alike.

This must be done, if Yugoslavia is to make progress and there are several ways to do it.

- a) Strict attention to all the published literature translation and distribution to all industry supervisory personnel, research institutes and universities.
- b) Representative attendance at the various technical meetings largely organized in Europe, Canada and the United States by TAPPI and other technical associations.
- c) Staff visits between various Yugoslavian mills and the regular interchange of technical information and discussion of problems.
- d) Co-operative interchange of information between various chemical and other suppliers and the pulp and paper industry. This would cover the needs for new chemicals, wood, plastics, etc.

## 6. Quality of Products

Generally speaking there are two qualities: Domestic and Export. The latter is higher for it faces competition on a quality basis as well as price.

Such a differential seems unwarranted. Why penalize a domestic consumer because he is a Yugoslav?



It should also be pointed out that it is just as easy to make a good product as a poorer one, it reduces stocks to one quality and lessens inventory.

Quality in the paper industry starts in the forest, then progresses thru the Industry to the final consumer.

Thus the paper industry must start in the forest and obtain suitable wood of quality. The pulp mill systems must properly cook, screen, clean, bleach and ship properly prepared and protected pulp. In turn the paper mills must exercise extreme care all along their production lines to supply clean uniform quality. It is a big job, complicated, but attainable and necessary.



1910

At the course of the past 12 months, no other curricular  
changes had been made other than were noted.

pleased, effective, cooperative and the project is  
conducted in the forest service and the forest  
and the forest agency to manage. Information is obtained  
is requested, a collection of various other information  
is provided for experimental purposes. The projective  
in helping to reforest the forest. The projective  
consequently, the non-cooperative attitude on the forest  
and long protection service provided to extend the  
this project.

Information was obtained on a new recovery system for neutral sulphite chemicals. This process might be applied to sulphite - lignin removal - or sulphite recovery, preventing stream pollution and possibly, in some cases of pollution, it could be used because of the interest during the past many years in the use of sulphite.

3. The Bureau is requested to connect with the Director of the Navy project, or connect with the development team who is interested in providing \$7,500,000 for bridge purchases as of 1962.

The learner registered as a candidate in the prelims & early negotiation on that August 4th. He willing to pay a reasonable fee for a feasibility study. This fee to be paid later and to become a part of the loan if the loan was granted.

The above information is based on the best of my knowledge and belief. I am not aware of any other information that would affect the above information.





1) Travel

Inside of Yugoslavia

The contractor in the course of his work travelled to the various mills. The most extensive trips were along the Adriatic coast from north to south on the Drava River and south to the Adriatic at Rijeka - Zagreb - Trieste. Besides these, trips were made to the interior area to visit the mills on the Sava River and those on the Save between Belgrade and Tuzla. One trip was made to Ljubljana.

Besides this, the contractor extensively travelled in most of the area of Yugoslavia at his own expense in order to observe the pulp and supply problems.

Outside of Yugoslavia

Bruxelles

The contractor at his own expense travelled to the meeting of the European Study Group of 1951 at Bruxelles. This group composed of engineers and research men from 11 of the western, northern and central European countries met once a year for discussions on advanced techniques of pulp and paper making. Part of the time is spent visiting pulp and paper mills in one meeting area. He visits discuss their problems, their their processing and their future - discuss international freely.

He suggested several new meeting meetings. Meeting an opportunity to do some work in Europe.

Frankfurt

The contractor was invited to visit the Wirtzweiler Mestel - an important trip and observe the first high speed sulphate plant now in operation in Europe.



This inspection was not sufficient as the plant was built with American old tools shortly after the war and has been continuously modernized since then.

More possibilities of improvements in processing were noted which could be of importance to the mill.

However, the mill has chosen and purchased other equipment for its system.

The contractor declined an invitation to visit the mill of the Austrian mills because of the personal expense involved.

#### Messeldorf

The contractor at his own expense attended the "Grapo" fair, a bi-annual exhibition of pulp, paper and converter products. It was an amazing exhibition of advanced techniques and an indicator of the future trends in printing and converting. So far as is known no Yugoslavian paper maker attended.

These meetings, visits and exhibitions were worth the contractor's own expense as they are one of the means for keeping up with the progress. Yugoslavia does not take advantage of these opportunities.

#### e) Activities

The contractor was requested to give a series of talks to engineers and paper makers on a group of topics. The meeting was held with about 30 men present. Two topics were discussed, pulp wood cutting and delivery to the paper mill with emphasis on mechanical handling as used by Feyerhuser, Rotor and other mills.



the other a discussion of paperboard printing, and the  
display design as practiced in the U.S.

Several other meetings were cancelled, and it was  
because of the vacation season. A final meeting to  
discuss the broad over-all pulp and paper problems is  
scheduled, the purpose is to briefly review this report.





VI. SUMMARY OF THE WORK OF THE INSTITUTE

1. Review of processing for Cotton stalk pulp and board mill for Ash River Area, Republic of Sudan.
2. Information request filed.
3. Outline of preliminary cold soda experiment.
4. Proj. V. of pulp and board mill project reviewed.
5. Asher pulp and paper project plans reviewed.
6. Institute experimental paper machine specification prepared.
7. Information developed on the economic factors affecting Ash River project in Sudan, covering raw material, water supply, labor, climate, etc.
8. Asher pulp and paper project plans reviewed.
9. Information collected at Bruxelles given to the Institute and others.
10. Pulp recovery system information submitted.
11. Reporters' Reports - Valencia. Information obtained and transmitted to the Institute.
12. Preliminary report on Cold Soda pulping prepared and distributed.
13. Report on the equipment prepared as requested by Mr. Kaiser.
14. Cold Soda processing of agricultural waste.



15. Review and Comments on 6 months activities in contract.
16. Latex and Water Analytical preliminary reports.
17. Observations and Comments on Vides Krška.
18. Observations and Comments on Vedeče.
19. Ledvelna wet machine project reviewed.
20. Observations and comments on Vevče.
21. Observations and comments on Ledvoče.
22. Outline of High Yield Sulphite Experimental program - Calcium and Sodium Base.
23. Memorandum on contract provisions and revisions.
24. Acid Sulphite pulping of Douglas Fir.
25. Observations and Comments on Veličev Paper and Mill.
26. Waste Paper Quality Improvement.
27. Preliminary outline of experimental work required for Iznica Viscosa Pulp Mill.
28. Information developed on Shadow or Shell marking at Black vrh.
29. Waste pulp and paper project plan reviewed.
30. Observations and Comments on Velišće.
31. Observations and Comments on Maglač.
32. Observations and Comments on Fršador.
33. Observations and Comments on Šjeko.



34. Observations and comments on major lakes.

35. Basic weights - standard size of 100 to metric measurements.

36. Problem of Cold Soda High Yield Sulphate Continued.

37. Central sulphate processing of carbonates and for  
Long's Island.

38. Observations on Comments on Cold Soda Sulphate Paper #11.





SECRET

The following information is respectfully requested in order to obtain knowledge and background of the Pulp and Paper Industry. With the information requested, faster and better solution to problems will result.

-----

I. Raw materials

A. Coniferous Woods

1. Species
2. Location by species
3. Areas of accessibility under present conditions
4. Areas of future accessibility - plan of opening up these areas and when
5. Land area of accessibility in hectares and some classification of size of plots available for harvesting
6. Average stands in volume by species
7. Annual growth increment by species
8. Management plan of harvest with due regard for steep slope, high elevation, reseeding of cut-overs
9. Reforestation plans  
    Reseeding  
    Planting and nursery plans
10. Availability of saw mill and wood working waste - species, type and volume at locations.

B. Deciduous Species:

Some information as on coniferous species.

C. Annual plants:

Straw - rice, wheat, millet, barley, flax,  
Cane, Arundo Donax, reeds and other canes which  
might be found along Danube & tributaries,  
coastal region

Stalks - upland cotton - corn, hemp butts & waste

Names, availability in areas - present use for fuel,  
cattle fodder, thatch or other uses



Exhibit 2

Program of expert's activity.

The plan of 1959 Technical aid foresees the expert's activity in the field of semi-chemical pulp production. There are 3 main lines of activity:

- a) laboratory work (testing of indigenous raw materials)
- b) engineering work (setting up of mostly suitable technological production processes, taking into account the economy of such processes)
- c) the settling of a plan for erection of semichemical pulp and paper mills in this country.

The enable the performing of activity mentioned under a), through the program 1959 (TIO-3/ 152-23-110-5-90283) following main apparatuses were purchased:

one heat exchanger to the existing lab. digester 150 L  
one electric steam generator to the same apparatus  
one group digester, capacity 6 x 1 litre  
one Sprout Waldron refiner  
one Valley beater  
one folding endurance tester  
one centrifuge  
one pulper.

With the installation of these apparatuses the performing of laboratory tests will be assured. Many tests can be already performed to-day.

We don't know enough about the special field of activity of Mr. Perry, so it is not realistic to fix for a longer period his daily work. Anyhow, we suppose following program for the first two months:

- 20 days: rest taking information about activities of our Paper Institute and introducing the expert to other related institutes (of forestry etc) and institutions (Engineering biro Ljubljana and Zagreb)
- 5 days: settling a definitive program of laboratory work in the Institute
- 35 days: Performing of tests.

There is the laboratory personnel available. The expert's activity will be limited to giving advice in this work.

Ljubljana, 17.I.1961

INSTITUT INDUSTRIJE  
PAPIRJA  
LJUBLJANA-VEVČE  
(Ing. Bonač Stane)



I. Chemicals available in Yugoslavia and Europe:

Chlorine liquid,  
Bleaching powder,  
Caustic soda,  
Sodium Sulphate,  
Spent Rayon liquor,  
Sulphur,  
Sulphuric acid,  
Sodium or hydrogen peroxide,  
Magnesium Sulphate,  
Silicate of Soda,  
Sodium Hydrosulphate,  
Zinc Hydrosulphite,  
Aluminium Sulphate

1. Prices per kg or metric ton, delivered duty paid.

2. Paper making chemicals:

Rosin size,  
Kaolin,  
Casein,  
Starch,  
Urea or Melanine resins,  
Latex or elastomer resin emulsions.  
Prices per kg or metric ton delivered.

III. Waste paper availability -

Waste paper available in Yugoslavia

A. Wood pulp substitutes,  
Envelope cuttings,  
All bleached white pulp cuttings,  
Corrugated shipping case cuttings,  
Kraft bag wastes

B. De-inking grades -  
Office waste,  
Old magazines

C. Board making wastes,  
Old corrugated boxes,  
Old multi wall socks,  
Old newspapers,  
Mixed paper

Tonnages available by grades.

Description of sorting and distribution





- A. Paper and paper board production by tonnage and grades for past 5 years.  
Future expansion plans - presently under construction.  
Anticipated but not formalized.  
Locations under consideration.
- B. Paper and Paperboard Consumption.  
Imports by grade and origin,  
Exports by grade and origin
- C. Volume used by Industries.  
Packaging types and products packaged,  
Printing  
Converted into business and cultural use  
Converted products, towels, toilet paper etc.
- D. Expansion plans of package using industries  
cement, sugar, food, can goods, bottled goods,  
consumer products, textiles etc.  
Expansion plans for printing plants.  
Plans for export.
- E. Shifts in consumption patterns  
such from tile roofs to fire proof shingles,  
built up membrane roofs etc.  
Use of wall board, hardboard, etc. to  
replace lumber, plywood etc.

V. IIP - Research Laboratories:

1. Would like a list of all equipment on hand of a major nature - do not include glassware, small items
2. List of all equipment presently on order but not delivered - expected delivery date
3. List of equipment desired to complete the laboratory objective
4. Summary of various pulping experiments made by laboratory

Note - Items which seem to be lacking:

1. Microscope with photo attachment.
2. Concorra tester with press and ring compression tester unit
3. Fiber classifier - Mc Nett or Clark
4. Chip screen and chipper
5. Centricleaner 3" and possibly a 6".



## VI. Pulp and Paper Mills

### A. List of Pulp and Paper Mills

1. Pulp mill process- raw material
2. Capacity in tons per 24 hours
3. Age of mill
4. Type of wood used
5. Location
6. Number and size of digesters
7. Bleached and unbleached

### B. Paper Mills: Location

1. Number of machines
2. Widths
3. No. presses each machine
4. No. dryers, width, diameter
5. Speed, maximum & minimum
6. Weight range
7. Types of products made by each machines
8. Average production 24 hours, each machine
9. Maximum production each machine,  
at weight, speed & width
10. No. of calenders, size of rolls
11. Other equipment, size presses,  
smoothing presses, winder, reels and sheetens

24 Jan. 1961



List of Institute's published works.

- 1) L'influence of chemical and technological sulphite beech digestion proceeding conditions on chemical composition of the pulp.  
Bilten Gen.dir.sav.ind.papira, Ljubljana, 1 (1948) 50.
- 2) Maize semichemical pulp and its properties as raw material for paper industry.  
Glasn.hem.društva, Beograd, 15 (1950) 219.
- 3) L'influence of delignification of straw by digesting under atmospheric pressure on the chemical composition and properties of resulting pulps.  
Kemijski zbornik, Ljubljana, 1951, 59.
- 4) Purifying and delignifying of beech pulp and its transformation to viscose.  
Glasn.hem.društva, Beograd, 16 (1951) 261.
- 5) Some characteristics in the properties of sulphate pulp made from bosnian spruce and pine.  
Glasn.hem.društva, Beograd, 17 (1952) 215.
- 6) Modification of H.Niehammer's apparatus for volume unit of wood weight determination.  
Glasn.hem.društva, Beograd, 18 (1953) 295.
- 7) Properties and usability of our poplar wood for pulp production.  
Vestnik Slov.kem.društva 1 (1954) 53.
- 8) Extracted oak and chestnut wood chips as raw materials for pulp.  
Glasn.hem.društva, Beograd, 19 (1954) 427.
- 9) Salix alba as raw material for pulp production.  
Vestnik Slov.kem.društva 1 (1954) 185.
- 10) Chemical testing of beech wood originated from slovene forests.  
Vestnik Slov.kem.društva 2 (1955) 33.
- 11) Lime tree (Tilia grandi-folia) as raw material for pulp.  
Glasn.hem.društva, Beograd, 21 (1956) 171.
- 12) Populus tremula L as raw material for pulp and paper production.  
"Topola" Bilten Jug.nac.kom. za topolu 1 (1957) 93





- 13) In cooperation with prof. Semec:  
Influence of different types of starch on the mechanical  
paper properties.  
"Die Stärke" 9 (1957) 125.
- 14) Chemical testing of bosnian beech.  
"Sumarstvo" sv. 1/2 1958, 58.
- 15) Populus tremula L as raw material for sulphite pulp  
production for use in paper industry and for further che-  
mical conversion.  
"Topola" 2 (1958) 595.
- 16) Partly rotten wood as pulp raw material.  
"Sumarstvo" 1959.
- 17) Forest and saw mill wastes as raw materials for pulp  
production.  
"Tehnika" XIV br. 4.
- 18) Differences in technological digestion conditions for  
sulphate and sulphite pulp from spruce, beech and poplar  
wood.  
"Tehnika" XIV br. 5.
- 19) Differences in technological digestion conditions for  
sulphite pulp from spruce, beech and poplar under  
different pH values.  
In print.
- 20) Chemical and technological conditions for rice straw pulp  
and semichemical pulp production.  
In print.

Ljubljana, 24.IV.1961



History and comment

Technical Assistance Contract 1801c

Upon arrival March 15, 1961 an initial program was presented which outlined the following:

"Three main lines of activity

1. Laboratory work-testing of raw materials
2. Engineering work - setting up most suitable production processes - taking into account the economy of such  
processes
3. Setting of plan for erection of semichemical pulp mill. "

"As the Institute does not know enough Perry's special field of activity it is not realistic to fix a period of longer than 40 days". Of this period 20 days was to be devoted to taking information about the activities of the Institute and other related institutions of forestry, etc. Engineering Büro, Ljubljana and Zagreb. 35 days were set up for making tests. Laboratory personnel would be available, Perry's activity would be limited to giving advice".

Early in the period information was requested by contractor so that background information and knowledge could be obtained so that some practical plans could be made. It has never been received.

It was late May before any laboratory personnel were assigned. Then work was started as it could be fitted into the work schedule. As a result progress was slow.

As time permitted pulping trials were carried out on spruce, beech, poplar, agricultural wastes. The addition of latex to the beater was demonstrated.

Contractor supervised all the work. A great deal of the work himself assisted by a young engineer who carried on most of the routine. Technicians made the physical tests.

As for the engineering work and plans for erection of pulp mills, there are not functions of the Institute. Advice and assistance was given to the staff of the Büro when asked for. It was asked for and advice and assistance was given on Donji Brijuni, Liden, Gromote Mitrovica, Količsko, Drvar, Podvelka, Slivka, Zagreb and many minor projects. They covered a wide range of items, machinery and drawings, economic information etc.



Repeatedly installation of cold soda plant was asked for so that cold soda pulping work could be completed.

Press chemicals of known purity have been asked for so that some of the spruce semi-chemical work could be completed.

Work on groundwood brightening for Videm is to be done. It has been held up pending receipt of Zinc dust.

Back in May when progress on pulping was insisted upon, the Institute claimed that they had never seen the contract and the contents were unknown. The Contractor supplied his copy. Any questions which were asked and they covered paper specifications, pulp, use of agricultural wastes, manufacturing problems etc. were answered promptly.

As for the terms of the contract which was written by the persons unknown to the Contractor or TAA and signed by the Yugoslavian Embassy for TAA. It can be assumed that someone approved the contract and the Yugoslavian Embassy Washington was authorized to sign.

It also must be assumed that USOM/Y was in constant contact with TAA and ICA/W in the development of the PLO/ta and contract. This contract took one year to prepare and get signed. The terms therefore will be commented upon:

#### Ann. B-A-a (First 6 months)

1. This requirement was included at the request of the Contractor and the information received has been most helpful.
2. Advise and train Yugoslavian engineers in proper use of deciduous woods etc.

Comment: The Institute has been asked repeatedly for a summary of its pulping projects so that a starting point could be determined and any gaps filled. No information was received except a list of the publications by Mr. Nađirerić. Obviously the Institute has done a great deal more than was listed. In fact it was obvious that most of the species of Yugoslavian woods have been pulped many times in the past years. If the research has been carried out in an orderly fashion little more knowledge seems needed on a laboratory basis of pulping these woods by the conventional methods of sulphate, sulphite or NSSC.

It was quite obvious from the discussions that the cold soda process which is some 10 years old was largely unknown because the argument was advanced that no pulping process could be as versatile as it had been described. Yet the process is in operation in the USA, Japan and there may be installations in Europe. Some 1,200 tons is produced daily for use in newsprint, book papers, tablet papers and various boards. It seems likely that cold soda will replace Neutral Sulphite because of its lower cost and versatility. Actually it is the only economical groundwood type pulp from hardwood.





The work upon which an old Institute has demonstrated that a groundwood type pulp equal to a true groundwood can be made. It is equally true that if large amounts of poplar are to be used in newsprint color pulp will have to be used.

The Contractor has made a statement that the Institute had ignored the cold soda process even when it was found out that the Zagreb Paper Mill had had research work done in the USA and had purchased some equipment and the Industrijski biro had designed the mill. This work was done on poplar, a minor species in Yugoslavia growing only in plantations. No work was done on Beech, though it is the predominant species.

In January 1962, the contractor was informed by the Institute that it had investigated cold soda beech pulping and had concluded it was impossible; as further proof it showed a letter from a Danish firm which stated that they had tried it in 1959 and had abandoned the idea. No details were given of the operating conditions. These statements were presented regardless of the results obtained at the Institute during the Summer and Fall of 1961. These results were those of the Institute's own technicians.

Just how this investigation was carried out without a commercially built refiner in the laboratory has not been explained. The Spiout Waldron Refiner given by USOM was not delivered until October 20, 1960.

Some of the reluctance to this development stems from a visit by a Yugoslavian team to the Great Northern Paper Co. This Company "built a very extensive plant using the Chemi groundwood" process as developed some 20 years ago by the N. Y. S. College of Forestry.

It essentially consists of impregnating pulp wood logs with neutral sulphite cooking liquor, cooking and the grinding the logs.

There is no question about this process work technically, however, the impregnation of whole logs poses some difficult production problems which Great Northern has learned the hard way.

The capital costs and maintenance costs are fantastic. So far as known, the Great Northern plant is the only one that has ever been built. It has been rumored that Great Northern has given up the process in favor of cold soda as of Jan. 1961.

There seems no point in going back 20 years to an impractical process, even if some Yugoslavian engineers spend a day or two at the plant of Gr. Northern.

As far as the contractor is concerned, high grade sulphite using as little as 10% and cold soda sulphite using 30% research rewards for Videm Krško and Prijedor.



Develop plans for use of domestic raw materials etc.

Comment: Requests have been made for 11 months for information on availability of raw materials, availability of chemicals and other necessary data so that some orderly plans could be made. Nothing definite has ever been supplied.

In fact the Contractor doubts that such a study is within the scope of a chemical research laboratory. The information required to complete such a plan is in the field of engineering and economics.

Assist in choice of equipment and installation of equipment etc.

Comment: The choice of equipment is an engineering design problem and involves work with the engineers who are designing the plants and the groups which will operate them when the plants are built.

A great deal of this work has been done as far as choice of equipment is concerned at the Biro. It is not within the scope of the Institute.

So far as installation is concerned no plants wherein a choice of equipment has been recommended will be in operation for at least a year after the contract expires.

For plants now in operation, the same will be done when requested. There are several in operation which are in difficulty.

Recommend uses of pulp for final use.

Comment: On October 14, 1961 the Contractor urged that the cold soda processing be completed so that evaluations of different kinds of fiber combinations could be tried out.

Nothing further has been done as of February 1, 1962.

This Contractor refuses to guess or read crystal balls on matters involving billions of dollars even when quality of products appears to be a minor consideration.

Even with the most careful laboratory evaluations the jump from the laboratory to commercial operation is hazardous at best even with full knowledge of the proposed production facilities. Only an approximation can be hoped for.

It was suggested that a commercial plant be carried out to prove the Sremake Mitrovica plan at Videm Krško, actually using Serbian poplar, but the idea was turned down because it would interfere with production.

Videm reports the maximum amount of poplar they can use is 15 - 16 % at speeds of 330 meters per minute.









With the time concerned in getting things done, actual work on any projects would probably have to be completed by July 15 or August 1, 1962 at the very latest.

As for the requirements under the above article

Advise regarding long term plans etc.

Comment: The development of long term plans is probably the most vital project in the contract as far as the future of the Industry is concerned.

It was pointed out to IOA/W that this study should have been undertaken first, because, until a logical plan of development is made all other projects are immaterial.

IOA/W is a commodity and the industry is a service industry.

Paper or paper board in a sheet or roll is valueless until someone wants it to write on, print, make a box, bag, carton or use to wrap an article.

Thus an intimate knowledge of the development of all industry is necessary including the development of competitive materials and methods of shipping.

Six months to complete such a project would probably be sufficient providing information was immediately available and analyzing the information.

Offer assistance in organizing facilities etc.

Comment: This is more of Art. I-1-b2 which has not been started. Little training seems necessary as the present staff has been trained by the senior engineers and additional training is completed, a year away at least.

5. Advise existing mills on reconstruction etc.

Comment: This is also more of the same taken from Art. I-1b-3. No further comment is necessary.

Conduct demonstrations in use of laboratory testing equipment.

Comment: The equipment is in constant use by the literature technicians as is required by their work. Both senior engineers are familiar with its proper use and care and should be after 30 years of experience.

This clause therefore is a waste of time and unnecessary.







As for Prijeedor Louning is aware of this mill or its problems.

As for Belišće it has been in trouble for months, but tests have been made at the Institute. The results are unknown. When the problem first came up last spring request was made to see the operation. As it was still under guarantee, request denied.

As for bleaching semi chemical (Item 6). There is nothing complicated here. The Institute has been bleaching these pulps for years.

The use of bleached - unbleached semi-chemical pulps (Item 7) pose no major problems when the qualities are known and the types of papers required are known.

Speeding up of sulphite process (Item 8). The comments on Videm contain ideas for this as practiced in North America. The principal method or process is the well known "Chemi-pulp" process for using calcium base acid.

Unfortunately acid sulphite requires thoro penetration of the acid liquor which limits a speed up and the use of continuous cooking. Ammonia base gives faster penetration, however, Ammonia is probably in limited supply in Yugoslavia and has more important uses.

The sulphite process is considered obsolete and therefore improvements are limited to getting the most out of existing mills.

The use of Maize waste (item 9) and other agricultural wastes pose no technical problems so far as pulping is concerned.

They however pose presently unsurmountable problems in collection, storage and use except in special situations.

It has been recommended in a special report that until the wood supply is fully utilized, consideration of all agricultural wastes be abandoned.

#### General suggestions (item 10)

Any general suggestions asked for have been given and this will be continued.

As for the waste paper quality, this poses a complicated problem as the industry is not organized. The quality is poor and improvements which can be made will have to be studied at the source.









### C. Future Planning for the Packaging Industry

This requirement should really have been first of all been started and as was reported to NCA/Washington when the first came up.

It is elemental to make paper and build mills to meet the end use demand requirements.

The contractor really believes that it should have top priority.

### D. Project Requirements of Lower Priority

#### 1. Advice on the Institute function etc.

The contractor has had considerable experience in the establishment of research organisations and knowledge of how many of the world famous ones operate. This project is more than just report writing. It is a matter which should probably be considered by a committee of all interested groups. Any advice however on basic function will gladly be given to any control group.

### E. Educational and Training

#### 1. Demonstration of equipment.

2. Theoretical design of any plants. Specific advice is regularly given.

3. Any training function.

### F. Such Other Advice etc.

1. Any advice on wood supply, waste paper quality or on other questions will be given as time permits.

It should also be made clear that, if these projects are to be completed, any information requested must be made available immediately and that such services as typing, translations etc. must be done quickly by competent persons.



### Conclusion

Eleven months have passed a tremendous amount of work remains to be completed and a large amount has not been even started so that efficient action is necessary.

This report states what should be done which in the contractor's opinion is important. However TAA and the Paper Industry Association should be the final judges of what is important and assign the priority. However under no circumstances should the completion of the pulping studies be stopped.

Attention is also called to the fact that while this contract is between TAA and the contractor USOM/Y and AID/W have an interest and apparently must approve any changes in the requirements because performance is judged solely upon the written contract as it was signed.

Respectfully submitted

Henry J. Perry





IZJAVILNOST  
Industrijske papirnice  
Ljubljana-Vevče

Ljubljana, November 12, 1961

Schedule of expert's activity  
for the next 6 months

(period of time between December 1, 1961 and May 31, 1962)

Expert: Mr. Henry J. Perry  
Institut industrijske papirnice, Ljubljana-Vevče.

Basic project: semi-chemical and chemi-ground wood production  
paper and board production for wrapping  
purposes.

Details of the projects.

No 1: High yield pulp production / semichemical pulp by acid  
sulphite process.

Pulp mill Videm Krško..... 3 days in XII, 3 days in  
January-February 1962.  
Pulp mill Vevče (Medvode).... 4 days in I - III, 1962  
Industrijski biro ..... 5 days in I - V, 1962  
Institut Vevče ..... 5 days in January 1962

No 2: The use of beech wood for newsprint production.

Pulp mill, paper mill Videm-Krško  
6 days in I/I  
Industrijski biro ..... 3 days in IV/V 1962  
Institut Vevče ..... 5 days in I/I

No 3: The use of Douglas fir for paper industry:

Pulp mill Videm Krško ..... 3 days in I/III 1962

No 4: Ground wood resp. chemi-ground-wood production. Blaschinger

Paper and pulp mill Kalsbein 5 days in I/III 1962  
Pulp- and paper mill Videm  
Krško .. 3 days XII-1961 and 1962  
Industrijski biro ..... 15 days I - V, 1962  
Institut Vevče ..... 3 days I/II 1962

















The final objective of improved forest investigation, increased production, lower costs and very possibly better quality will depend upon the cooperation received in supplying economic data, the liaison between the various mills and agencies concerned and the contractor.

Due to the great multitude of problems facing the Industry the above projects must be carried on to the point of application. Research for academic interest Yugoslavia cannot afford for some time to come.

It should be noted that the contract calls for assisting in choice of machinery, developing plans for better use of raw material resources, expansion, modernization etc. The fact is that these functions are not the concern of the staff of the Institute nor does it have the facilities to carry out such activities.

From such observations as have been possible much of this work seems to be the function of the Industrijski biro.

It is probably authorized by a wide variety of agencies such as the National Investment Bank, the Paper Industry Association, the individual mills and a variety of cooperative enterprises proposed or existing.

In order to function properly, it becomes imperative that detailed objectives be supplied and that the supporting data be freely given and discussed.

Absence of such information not only prevents the successful conclusion of the contractors work, but can also result in unproductive use of the Yugoslavian investment funds.

#### Six Month Period

1. Continue with the refinement of the pulping programs. This objective can be reached if the support required is supplied.

2. A second project come into focus during this period. It is "define the role of the Institute ....".

The Institute is presently confined to very cramped quarters and its effectiveness has equally be cramped. This condition will be partially corrected when the new building is completed in the next year or two.

Therefore it seems imperative that the proper role be defined on broad terms of scope as the objectives. If the plans of development be specific so that Yugoslavia can benefit from the large investment in buildings and equipment without undue delay.

From what has generally been observed the Institute seems to be in a precarious financial position. As such it is required to spend time on projects of low priority benefit to the economy which, however, offer a financial return to the Institute.



The following information has been requested so that a proper role of the Institute can be defined and its effectiveness increased:

1. A list of all the projects undertaken during the past 5 years.
2. A list of all the projects planned for the future.
3. The past, present and future composition of the Institute's staff.
4. The present and future composition of the Institute's equipment.
5. The present and future composition of the Institute's budget.
6. Its proposed budgets for 1962 and the budget planned upon completion of the new building.
7. Its proposed method of financing its expanded activities in the new building.
8. Its past liaison between the various agencies concerned with the paper industry expansion and the present paper mills.
9. A list of all projects undertaken during the past 5 years.
10. A list of all the projects planned for the future.
11. Outline of present staff and their functions.
12. Outline of present and future equipment.
13. Flow chart of the organization of the Institute.
14. A list of all the equipment available to the Institute.

The information requested is compared with the role of the Institute and the Institute is asked to improve its effectiveness.

Certainly there seems to be a crying need for a well managed adequately financed Institute capable of solving the many technical problems facing the pulp and paper industry.

It is to be hoped that all of the above mentioned functions of the Institute will be carried out in the new building and that the Institute will be able to carry out its functions with equipment and staff which will be adequate for the needs of the pulp and paper industry.

3. "..... offer advice on reconstruction and design of facilities". The past six months have shown that the functions are not the concern of the Institute.

They are vested in the Industrijski biro which is not only in pulp and paper on a national basis, but all types of industry or









American and Foreign Firms and Organizations Cooperating with the Contractors:

The United States Department of Agriculture  
 U. S. Forest Service - Washington  
 U.S. Forest Products Laboratory, Madison, Wisconsin  
 The United States Government Printing Office, Washington  
 The New York State Conservation Department, Albany, New York  
 The University of Maine, Orono, Maine  
 The Institute of Paper Chemistry, Appleton, Wisconsin  
 New York State University, College of Forestry, Syracuse  
 The American Paper and Pulp Association, New York  
 The Waste Paper Utilization Council, New York  
 Ward Paper Co., Merrill, Wisconsin  
 Bauer Bros, Springfield, Ohio  
 U. S. Machinery Co., Switzerland  
 Ing. Piesslinger, Linz, Austria  
 Müritaler Zellstoff- und Papierfabrik, Bruck a. d. Mur  
 IMPCO, Nashua, New Hampshire  
 Beloit Machine Works, Beloit, Wisconsin  
 Trimby Machine Works, Glens Falls, N. Y.  
 Grundler of. St. Louis, Missouri  
 Comm. Toniolo & Figlio, Milano  
 Alvin H. Jonhason Inc., New York  
 Lunmus Inc., Paris  
 Sand Machinery, Paris and Sundsvall, Sweden  
 George Sivola, Helsinki, Finland  
 Huyck Corp., Rensselaer, New York  
 Coheloa, Bruxelles  
 R. P. Andrews Co., Washington  
 Niagara - Mohawk Power Corp., Syracuse  
 National Welding Co. Ltd, Montreal  
 Blaw Knox Co., Pittsburg, Pa  
 Canadian Pulp and Paper Research Institute, Montreal  
 Canadian Pulp and Paper Association, Technical Section,  
 Montreal  
 Hooker Chemical Co., Niagara Falls, N. Y.









